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these ancient documents are in some way related we do not doubt. We think that Mr. de Bunsen, in trying to trace this relation, has entered a road which really leads somewhere, but that he quits this road again before he is fairly started. Among other things, we think that the relation between the Semitic and Aryan traditions of the flood and the ark deserves even more careful examination than it has already received from Burnouf, Pictet, and others. But we cannot speak without strong protest against such an argument as that at vol. i, p. 10, where value is ascribed to the resemblance between the name Noah, and an Aryan root found in *naus*, *navis*, etc. We believe we have met with the notion before, but such mere jingling resemblances of sound, so far from being historical evidence, are mere puns which may be made between any two languages, and can only rank with Voltaire's serious identification of Brahma and Abraham, and the celebrated joke about Jupiter and Jew Peter.

We have been surprised, perhaps unreasonably, to find that an author whose canon of Biblical interpretation seems rather elastic and indefinite, should yet venture to use Biblical prophecy as a means of accurately determining the chronology of future events. Putting certain dates together, and starting from 1864, he remarks (vol. ii, p. 469): "During the coming fifty years we therefore have to look forward to the fall of 'Babylon,' to the exodus of God's especial people from the Israel of all nations, to the rebuilding of Jerusalem and of the temple, and to the establishment of the Messianic theocracy in the Holy Land. The future will show in how far these views are correct." There is no denying the soundness and sufficiency of the test by experience to which Mr. de Bunsen thus subjects himself. All that we can say is, that we hope he may live to see his views as to the events of the coming half-century confirmed, or refuted, as the case may prove.

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## DUTCH ANTHROPOLOGY.

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HOLLAND, which has been a learned country for a succession of ages, has also been eminently conspicuous for writers on most of the branches of anthropological science. It numbers amongst its distinguished anatomists Coiter, Bidloo, and the famous Bernard Siegfried Albinus, whose tables of man's skeleton are still highly esteemed for their great fidelity. The celebrated Peter Camper, who occupied the chair of anatomy in different schools, was equally

remarkable as a man of science and a man of taste, and was an accomplished draughtsman. His anatomical drawings are beautifully executed.\* Camper's great contributions to anthropology appeared posthumously, edited by his son Adrian Gilles Camper.† In the opening paragraphs of this volume, Camper dwells on the visible differences of diverse nations. He says, when in a great commercial city, like Amsterdam, people from all parts of the world appear in a public assembly, we are able at a glance to distinguish not only the black from the white, but, amongst the white, Jews from Christians, Spaniards from French and Germans, and these again from Englishmen. A Scotchman may be distinguished from an Englishman, and this latter from an Irishman. In the cities of Holland, we do not perceive the particular national traits, yet the islanders still retain their original features. In Friesland, the inhabitants of Hindelopen, Molkwerum, and Koudum, still have narrow faces and long lower jaws; whilst those of Bildt, by their short and broad set forms, are to be distinguished very obviously from their nearest neighbours who dwell upon the old land.‡ In this work, he constantly employs two lines in the delineation of the leading peculiarities of the human features; the horizontal line, drawn along the lowest part of the nose and through the opening of the ear, and the facial line, which runs obliquely, touching the upper front teeth and the forehead. It is the

\* Pen and ink sketches of the bones of the left tarsus of the cameleopard and of the sheep, signed "P. C., f., 4 Sept. 1786", from his hand, in the possession of the writer, are marked by much delicacy. A curious letter of Camper's, in English, may also be mentioned. It is dated June 22, 1788, and addressed to Sir Jas. Ed. Smith, immediately after the latter had established the Linnean Society. The founders of this society had proposed to Camper to make him one of their *four* Honorary Members, and Sir James had communicated such intention to The Hague. Camper, in acknowledging this communication of the President, professes surprise at the proposal, although he should esteem it a great honour to be connected with a London society for the prosecution of natural history. He says: "It would do me little honour, I fancy, to be of any Linnean Society whatsoever. I look upon Linnæus as a mere cataloguist, and the most superficial naturalist I ever knew. . . . As I have given myself great pains on quadrupeds, birds, amphibious animals, and cetaceous fishes, I discovered every day his errors and his unpardonable ignorance." Although Sir Jas. Smith wrote a vigorous and persuasive remonstrance in reply, of which I possess the rough draft in his autograph, Camper remained unmoved, and his name does not appear among the "Foreign Members of the Linnean Society, 1790."

† "On the Natural Diversity of the Traits of the Countenance in Men of Different Countries and of Different Ages"; "On the Beautiful in Antique Statues and Sculptured Stones"; followed by "A Representation of a New Mode of Drawing the Human Head with Accuracy", Utrecht, 1791, 4to. These dissertations, designed rather for artists than ethnographers, were translated into German by the renowned anatomist S. T. Sömmering, Berlin, 1792, with copies of all the plates.

‡ The subject has been considered, in reference to this country, in chapter vii of the *Crania Britannica*, "Sketch of the Present Population of the British Islands, showing its Ethnographical Relations to its Antecessors".

intersection of these lines, at the lower edge of the nose, which forms the famous *facial angle* of Camper.

Edward Sandifort, the professor of anatomy at Leyden, added to the first volume of his magnificent *Museum Anatomicum*, fol., 1798, nine plates of human crania of different races. He thought it necessary to speak somewhat apologetically of this step in his preface; and, with right judgment, selected those skulls of the collection which were in an integral condition. These copper-plates were produced in a most sumptuous manner; each one embracing, in a single folio sheet, a front view and a profile view of the cranium, of the full natural size. The continuation of this grand work by his son Gerard, contains a description of a series of skulls and casts, with the history of some of the individuals to whom they belonged, elucidating the phrenological system of Gall. Gerard Sandifort, the successor of his father in the chair of anatomy at Leyden, conceived the design of figuring and describing, with measurements, in a separate work, the remarkable collection of skulls of different nations in the Leyden Museum; by which, he remarks, "anthropology" is so greatly illustrated. The three fasciculi of his *Tabulæ Craniorum diversarum Nationum*, fol., 1838-1843, embracing eighteen skulls, appeared in the same splendid form as the plates of his father. They were delineated by his own hand; and it is probable that these tables will always remain the most sumptuous plates of human skulls ever produced.

S. J. Brugmans, who had very great fame as professor of medicine at Leyden, formed a considerable collection of skulls of European nations, soldiers who died during the wars of Napoleon, for which he had great opportunities as inspector of medical service. But he was far from stopping at this point. On the contrary, he was accustomed to give courses of lectures at Leyden, on the natural history of man, for more than thirty years, the last of which terminated in July, 1819, the year of his death.

Gerard Vrolik not only collected crania, but extended his observations to other parts of the skeleton, particularly the pelvis, in which he anticipated finding diversities.\* He observed an animal form in the pelvis of the lower races of mankind, and regarded the structure of this part to present race-modifications, but drew scarcely any positive deductions from his limited researches.† His son, Willem

\* "Considérations sur la Diversité des Bassins de différentes Races Humaines", 8vo, 1826. "Platen behoorende tot de Beschouwing van het Verschil der Bekkens in Onderscheidene Volkstammen", fol.

† Gerard Vrolik's propositions have all been contested by Dr. Joulin ("Mémoire sur le Bassin considéré dans les Races Humaines", 1864), who maintains that it is impossible to speak with any certainty, as he allows may be done from the examination of the cranium, that a given pelvis belongs to any one race

Vrolik, materially enlarged the craniological collection, and prepared a good descriptive catalogue of it. In this, he arranged the objects under the five Blumenbachian types, dividing them into numerous families, and appended a series of measurements to each skull. Unfortunately he did not specify the mode of determining his *facial angle*, which seems always low. It commonly ranges about sixty-five degrees. It is to be lamented that he did not live to see this catalogue printed. It has, however, been extended to the whole of the beautiful anatomical collection formed by the two Vroliks, under the labours of Dr. J. L. Dusseau, and published in a handsome octavo volume.\* The Museum itself has been presented by Professor Vrolik's family to the city of Amsterdam, where we may hope it will be preserved and rendered extensively available to science. Professor W. Vrolik, jointly with others or alone, made many contributions to anthropological science.

The present distinguished professor of zoology at Leyden, who is so learned in natural sciences and so esteemed for his excellencies, stands preeminent as a cultivator of anthropology. Besides his large work on the negro race,† and the catalogue of his fine craniological collection,‡ the smaller contributions to the science from his prolific pen are very numerous, and always bear the marks of accuracy and sound judgment. Professor J. Van der Hoeven may with justice be regarded as one of the oldest, and certainly one of the most persevering promoters of pure anthropology. Since 1831, he has been accus-

rather than to another. His general conclusion is that, if by the observation of the skull we can divide the human species into three principal races, the examination of the pelvis furnishes two groups only. But we are unable to attribute the importance that might be desired to researches in which ethnological names have such weight; where, for instance, the races of New Guinea, of Madagascar, of the Mozambique coast, and of the west coast of Africa, are all confounded together under the common term of Negroes; and where Boschismans and Peruvians are amalgamated under the hypothetical denomination of Mongols. In truth, it might at once be asserted that, if all the first named races are one, there are no recognisable differences among mankind.

Dr. Tennis Zaaizer has made the description of two pelves of women of the Indian Archipelago the subject of his inaugural dissertation ("Beschrijving van twee vrouwenbekkens uit den Oost-Indischen Archipel", Leiden, 1862). This work is of much more importance than its title might indicate. One of the pelves is from the island of Nias, which is on the western side of Sumatra; the other from Java. Both are carefully described, with measurements; and both lithographed of the natural size, with the ligaments attached. The author then makes an elaborate comparison of these pelves with five other Javanese examples in Dutch museums, and lastly, with the very fine specimen of a European woman's pelvis, in the collection at the Leyden Hospital.

\* "Musée Vrolik, Catalogue de la Collection d'Anatomie Humaine, comparée et pathologique de MM. Ger. et W. Vrolik", par J. L. Dusseau, Amsterdam, 1865.

† "Bijdragen tot de Natuurlijke Geschiedenis van den Negerstam". Te Leiden, 1842, 4to.

‡ "Catalogus Craniorum diversarum Gentium quæ collegit J. Van der Hoeven", Lugduni Batavorum, 1860, 8vo.

tomed to give a course of lectures on this branch of knowledge, which he has defined, as the natural history of man.\*

Another able cultivator of natural science, Professor P. Harting, of Utrecht, should be mentioned as contributing an ingenious instrument for the use of craniologists.†

And it is impossible to omit in this hasty sketch, although it has no pretension to embrace all the writers on anthropological subjects the Netherlands have produced, the learned expositor of the ethnology of his native country itself, Dr. D. Lubach. His *Grondtrekken eener Ethnologie van Nederland*,‡ which he regards as merely an outline, is chiefly devoted to a careful investigation of the original historical authorities, and is a work of much research. It is to be desired that he will pursue the inquiry.§ A more recent essay from the same pen, prepared at the instance of the Netherlands Society of Medicine, is designed both to excite inquiry and to assist it, so that the ethnology of Holland may receive further cultivation.||

After these preliminary remarks, we may now proceed to the more immediate object we have in view, viz., to give a brief account of some recent Dutch contributions to anthropology.

Dr. C. Swaving, who occupied for many years a very important position in Netherlands India, being first physician to the city of Batavia, may be first enumerated as the most extensive collector of skulls of the Eastern Archipelagic races. There is scarcely a museum in Holland which has not been enriched by specimens of crania collected by this zealous gentleman—and many have been materially so—witness the Catalogues of Van der Hoeven and Vrolik. But he has likewise studied the crania of some of these oriental races very sedulously, and described them accurately, with measurements. A further continuation of his researches, of which the First Part alone has been published, referring to the skulls of the different races of Borneo and Celebes, is greatly to be desired.¶

\* He has explained that he used the term anthropology in this limited sense, and by no means in the more extended meaning which embraces physiology and empirical psychology. He adopted the designation after the example of Rudolphi, who employed it in a similar sense to that in which naturalists use the denominations ornithology, ichthyology, etc. "Schets der Natuurlijke Geschiedenis van den Mensch," 1844, Voorberigt.

+ "Le Kephalographe, Nouvel Instrument destiné à déterminer la figure et les dimensions du crâne ou de la tête humaine", par P. Harting, Utrecht, 1861, 4to.

‡ This 8vo. volume, which was completed in 1863, forms a portion of the Natural History of the Netherlands, and has many titles. As a division of this series, it bears the title of "De Bewoners van Nederland".

§ The author has himself given an analysis of this important volume, "Bulletin de la Société de l'Anthropologie", iv, 481.

|| "Ethnologisch Onderzoek van Nederland", door D. Lubach.

¶ "Eerste Bijdrage tot de Kennis der Schedels van Volken in den Indischen Archipel", door Dr. C. Swaving, met Platen en Tafels van afmetingen, Batavia,

The pathological condition of the basis of the skull, which occasions its change of form, an *apparent* elevation, *apparent* impression, or in-pressing of the bones, which has engaged the attention of different inquirers, whether morbid anatomists or craniologists, has received much further illustration from Dutch observers. It is of moment that changes of form should be understood in craniology, to prevent error and confusion—to enable investigators to perceive how much natural forms may be interfered with, and to define, as nearly as may be, the causes of deviation from the normal types. Pathological anatomists have at different times touched upon the loss of consistency and accompanying deformities in the textures constituting the walls of the cranial spheroid, but only in a very partial manner. According to Dr. Boogaard, the writers on cretinism were the first to observe it—Ackermann, Fodéré, Malacarne, Iphofen, and Nièpce. Rokitsansky briefly but clearly described it. Dr. G. Vrolik jun. met with it in the hyperostotic skull, the subject of his Academical Dissertation, and Professors Berg and Retzius noticed it in crania contained in their *Museum Anatomicum Holmiense*. Professor Lucae gave a careful description of an example in a woman of fifty-three years of age, which forms the subject of the seventh plate of his *Architectur des Menschenschädels*. In this place he dwells on the influence of the muscles of the nape of the neck, and the *sterno-cleido-mastodei*, in contributing to the deformation; an influence not wholly inoperative, though far less potent, in skulls of normal consistency. Dr. Finkelnburg, in a memoir on *Osteomalacia* and Insanity, brought forward two cases of acute *osteomalacia*, or softening of the bones, both of which were followed by insanity.\* These were regarded by Dr. Bogtstra as presenting the impression of the *basis cranii*, but the author described them in so imperfect a manner as to leave some doubt, whether the one of these cases which appears the more likely of the two to have been thus deformed, really were so.

The first memoir specially devoted to the subject, in which it was viewed more in an anatomical and anthropological point, than as a disease, was read before the Société d'Anthropologie de Paris, August the 21st, 1862, and appears in the *Mémoires de la Société*, tome i, p. 379, with two plates, containing three figures.† In this essay, the morbid process was designated *plastic*, and the term *plastic deformation* applied to the change of the form of the skull. This change is parti-

1861-2. "Eenige Aanteekeningen over de Sumatrasche Volkstammen", door Dr. C. Swaving, Batavia, 1863.

\* "Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medicin", band xvii, s. 119, 1860.

† "Sur les Déformations Plastiques du Crâne", par M. le Dr. Joseph Barnard Davis.

cularly to be characterised as one which may occur in adults and even in old age. In this memoir, five instances of plastic deformation of the skull are enumerated, two of which are remarkable, and lithographs of these appear. One of these, the calvarium of an old Guanche woman, from a cave in the island of Teneriffe, exhibits probably the most exaggerated impression of the base of the cranium yet observed. It may be worthy of remark, that the impression of the basis of the skull, although it indicates the most striking *apparent* feature of the pathological condition in question, but which as explained in the memoir just mentioned is only *apparent*, because it is the outer portions of the cranial spheroid that are depressed, whilst the more central remain stationary, on a fixed point, the vertebral column—besides this, it should be noted that this impression of the base is only one of the phenomena in the state of the bones—they have all been softened in their texture, and have become like a piece of clay, plastic and ready to be moulded into any shape by the operation of such extrinsic influences as may act upon them. This might be suggested as a reason for preferring to retain the term plastic in the denomination of this particular morbid condition, and which might be added to the one in use by the Dutch writers, thus making it *plastic impression of the base of the skull*. *Osteomalacia* designates this plasticity as a constitutional disease.

The earliest Dutch writer who took up this condition, Dr. Jan Nicolaas Bogtstra, whose name has already been mentioned, was directed to it by Professor H. J. Halbertsma, who recommended as the subject of his academical dissertation the description of five skulls with impressed bases, contained in the Anatomical Museum at Leyden.\*

The first chapter of this work is occupied by a full description of these five examples, the previous history of which was almost entirely unknown, except that the last of them was the skull of a Spaniard. They are of persons of different ages, some young and some old, generally aged, and marked by thinness and lightness.† Dr. Bogtstra made a capital addition to his descriptions in giving outline figures of the misshapen *foramen occipitale*, whose normal form is greatly interfered with in this morbid condition, and frequently rendered unsymmetrical. After a chapter devoted to preceding writers who have mentioned impression of the base of the skull, the third is taken up with a description of some hydrocephalic skulls, in reference to this particular impression. The result is, as far as it goes, not confirma-

\* "De Schedel met ingedrukte Basis", Leiden, 1864.

† They exhibit indications of disease in different parts; of periostitis, caries, and atrophy.



tory of the doctrine of Rokitansky, that this peculiar deformation is the consequence of hydrocephalus. Dr. Bogtstra has an ingenious system of measurement, by which he determines the degree of impression; and his essay is illustrated with excellent figures of the skulls themselves, some sawn open, so as to show the impression in the best manner.

Professor J. A. Boogaard has made the latest contribution to the same subject, which retains the figures and plates executed for Dr. Bogtstra's inaugural dissertation.\* Professor Boogaard goes very fully into preceding investigations, enumerating some references to the disease which had escaped the notice of previous inquirers. He has also recovered the histories of one or two of the skulls of Dr. Bogtstra's *Memoir*. Schedel ii of this *Memoir*, is that of a man of sixty-two years of age, who for the last twenty suffered gradually increasing paralysis, at length affecting the face and the organs of speech. On the opening of his body after death, there was found an effusion of blood under the *dura mater*, and of serum in the ventricles. For the full description of the symptoms and the appearances on dissection, reference must be made to the *Memoir* itself. The author has added three fresh examples of the morbid condition exhibited by these skulls, which he found in the Anatomical Cabinet at Leyden, after Dr. Bogtstra's dissertation had appeared. These do not show the impression, or change of form in a high degree; and perhaps the most interesting fact connected with them is, that one of them is the skull of a Turk of Belgrade. Dr. Boogaard has also made many other additions to the description of crania with *impressio basis*. One important result of his labours is the perfecting of Dr. Bogtstra's method of measurements, so as to determine as nearly as possible the degree of impression, and to be able to compare it with the condition of the base of the cranium in normal examples. His mode of ascertaining the elements of his calculations is illustrated by figures, but probably may be made somewhat intelligible by means of words. It should be premised that a bisection of the skull is almost essential to Dr. Boogaard's usual proceeding; still he has with great ingenuity succeeded in the invention of an instrument, by which he can measure the angles he desires in skulls which have not been sawn through. This instrument he has named a "clivometer", from the *Clivus Blumenbachii*. He gives a figure of it of one-third the natural size. We shall here attempt a description of his method in bisected skulls. He first draws a line, *nc*, from the root of the nose, *n*, to the lower surface of the basis of the skull behind the *foramen magnum*, *c*. This

\* "De Indrukking der Grondvlakte van den Schedel door de Wervolkolom, hare Oorzaken en Gevolgen", door J. A. Boogaard.

line, to prevent any confusion with the names employed by others, he denominates the *linea innominata*. In normal skulls it is *always* the posterior edge of the foramen with which this line comes in contact; *b c* is the median line of the foramen; *b e*, the line of the *clivus*, which runs from *b*, the free edge of the occipital foramen, to *e*, the *basis dorsi ephippii*; *f g* is the median line of the plane of the *planum spheno ethmoidale*, or the upper surface of the bony plate of the sphenoid covering the sphenoidal sinuses, which is continuous with the upper surface of the horizontal cribriform plate of the ethmoid. For brevity's sake, he distinguishes the line *f g* by the letter *A*, the line *e b* by *B*, and the line *b c* by *C*. The angles measured by Dr. Boogaard are these:  $\alpha$ , that formed at the junction of the line *A* with the line *B*, or the ephippium angle;  $\beta$ , the angle formed by the junction of the line *B* with the line *C*, or the clivus angle; whilst  $\gamma$   $\delta$   $\epsilon$  mark the angles formed by the intersection of these lines *A B C* respectively with the *linea innominata*. Fearing that this abridged account of Professor Boogaard's system of measurement cannot be fully explained without his diagrams, it may be well to add nothing further than the results of his observations on eight impressed skulls. He has found that the ephippium angle  $\alpha$ , in the normal skull, is in the mean 117, whilst in the plastically impressed skull it ranges from 101.5 to 156.5; the clivus angle  $\beta$ , in the normal skull, averaged 127, in the impressed examples it ranges from 123.5 to 203. It should not be omitted to be remarked, that Dr. Bogtstra had furnished tables of his measurements, obtained in a manner not very dissimilar from, but yet not so complete as, that of Professor Boogaard. Indeed, the work of the latter must be regarded as the most comprehensive and satisfactory that has yet been produced upon skulls plastically impressed at their bases. We subjoin the important deductions Dr. Boogaard has arrived at as the result of his researches, at length.

"1. The impression of the base of the skull by the vertebral column does not always arise from one and the same pathological process. All morbid changes, whereby the solidity of the bones which form the *basis cranii* is appreciably diminished, may have as a consequence impression of the base of the skull.\*

"2. The impression of the basis of the skull occurs as well in youthful as in old, and even very aged persons. It has not yet been observed in children.

"3. Hydrocephalus, whilst it may be regarded as a predisposing influence, does not necessarily produce impression of the *basis cranii*. This may arise and be considerable in skulls not hydrocephalic.

\* This is in exact agreement with the view maintained in the Memoir read before the Société d'Anthropologie de Paris, in which it is said: "Nous pouvons conclure de là que tout ce qui affaiblit la résistance du tissu osseux de la base du crâne peut donner lieu aux déformations plastiques", p. 390.

"4. We ought to distinguish different forms of impression, especially according to whether the impression limits itself to the neighbourhood of the *foramen magnum*, and is marked by a more horizontal state of the *clivus*; or whether it stretches, with relatively less change in the state of the *clivus*, more generally over the fore half of the base of the skull.

"5. In most cases the impression is symmetrical for the two lateral halves of the skull. Yet it may nevertheless be unsymmetrical, and be limited in some cases to one half of the skull.\*

"6. Whether it be recognisable during life depends on the *degree*, but especially on the *form*, of the impression. Only that form which is marked by a more horizontal state of the *clivus* can be diagnosed with any certainty.

Probably the most important recent contributions to anthropology from Holland, are *Memoirs* from the hands of the very accomplished and amiable Professor H. J. Halbertsma of Leyden. His numerous observations, upon various special points of anatomy and comparative anatomy, are to be met with scattered over many of the late scientific journals of his country. With these we are not here concerned. The first Memoir to which in this place attention will be called, is the *Description of an East Indian (Nederlands India) Idiot's Skull*.† In the year 1863, the Anatomical Cabinet at Leyden was enriched by receiving from Dr. Swaving forty Malay skulls, the greater number of which were derived from patients who died in the lunatic wards of the so-called Chinese Hospital at Batavia. One of these was the cranium of a Javan woman named Riela, whom Dr. Swaving had observed as an idiot, and who was remarkable for her ape-like appearance. On her reception into the hospital, her foul entangled hair was cut off, which revealed a thick wrinkled skin upon the crown of the head. Her face was strewed with blue spots, caused by the enlargement of small cutaneous vessels. Her left eye showed a slight obliquity outwards; the fissure of the eyelids was less open and more inclined outwards and upwards than that of the right. Her hands and feet were remarkably large, even in proportion to her head, which, by the great development of the face and swollen lips, had a repulsive animal appearance. For a Java woman she was very tall, namely, about 5 feet 7 inches English.

Riela said little or nothing, and that with a scarcely audible voice. She lay constantly on the back in her crib, and took no notice of the

\* In two cases in the writer's collection, this asymmetrical form of plastic impression is strikingly seen. No. 101, the skull of an African negro, exhibits this oblique impression, much aggravated on the right side. No. 622, the skull of a Kanaka, presents a still more unsymmetrical example, where the greater depression is on the left side.

† "Beschrijving van een Oost-Indischen Idiotenschedel", door H. J. Halbertsma.

outer world. Eight days before her death, which took place at twenty years of age, a photographic portrait of her was obtained, from which Dr. Halbertsma's curious Plate I is derived.

The great weight of the skull of Riela was at once perceived. With the lower jaw it weighed 1020 grammes, while the mean weight of eight Malay women's skulls was only 712 grammes. It appears that, besides the colossal development of her bones in general, this immoderate weight is to be imputed to the *hyperostosis* of the flat bones of the brain-case. These, as exhibited in pl. III, fig. 1, are considerably thickened.

Dr. Halbertsma affirms that it differs from the typical cranium of the Malay race, first in the brain-case, or calvarium, by the great retrocession of the frontal bone, by the singular height of the calvarium, by its general narrowness, and by the backward position of the *foramen magnum*. Of these diagnostic signs, we believe that of narrowness to be the most valid. The rest do not appear to us from the figures to be striking. In the remainder of the cranium, or the facial portion of the skull, the differences are, the unusual projection of the jaws, the great development of the jugal bones, which, especially with the narrowness of the brain-case, contributes not a little to give an animal expression to the whole head. Yet prognathism is not, we believe, rare in the Javan skull. He next institutes a critical anatomical examination of his two divisions of the cranium, pointing out the peculiarities in each, and especially dwells on those observed on the internal inspection of the skull. However interesting, it is not desirable to follow the author in this very careful investigation. After this follows a table of measurements and proportions, very judiciously conceived. The first column contains the mean of the measures of eight women's skulls of the Malay race, the second those of Riela's cranium, and the third those of the skull of the orang outan of Borneo. This table shows the unusual dimensions of Riela's skull, and the narrowness of its calvarium.

In his concluding remarks, Professor Halbertsma observes, that, by the comparison with the eight women's skulls of the Malay race and that of the orang outan, it cannot be denied that the cranium of Riela exhibits in its whole conformation an obvious deviation from the human type, and an approximation to that of the anthropomorphoi. The skull of Riela is longer and narrower, it is more prognathic, the facial portion both in breadth and length is more developed, the hard palate is longer and upon the whole larger than in the other skulls of her race and sex, and in all proportions approaches to the characteristic ape-form. In many other points also, the author asserts he has met with deviations in the same direction. Thus in Riela's skull the internal capacity is less, the *foramen magnum* placed more

backwards, the *planum temporale* enormously large, the alisphenoid feebly, the lower jaw massively developed, the *processus condyloideus* placed on a lower neck.\* In conclusion, he remarks, that in whatsoever degree the skull of the idiot Riela affords any support to Darwin's hypothesis he leaves unnoticed. Still, it furnishes a proof how the human form may recede to the animal type; and how the indications of this are not limited to one portion of the skull, but are manifested in the whole structure of the bony head. Finally, it may be suggested, whether rather too much weight has not been given in this very carefully prepared memoir to the tendencies to animal forms in the skull of Riela; and whether too little allowance has not been made for the morbid conditions which have resulted in idiocy and hyperostosis. The three good lithographic plates appended to this memoir are deserving of commendation. Such plates are of much moment in scientific illustrations, and receive from Dutch artists that attention they deserve. They are all printed in a small folio form. Plate I offers a face view of Riela, from the corrugated skin of the scalp to below her breast; plate II, a profile, and also a vertical view of her skull; and plate III, an inside profile view of her bisected skull, and likewise a base view of the same.

The next of Professor Halbertsma's Memoirs to which we propose to direct the attention of the reader is that upon the *Asymmetry of Javan Skulls*.† This phenomenon, principally manifested in the obliquity of the occiput, is not by any means confined to the crania of Javans, but, as the author affirms, in no human race are there so many asymmetrical skulls as in the Malay. Yet, some of the most exaggerated examples in the collection of the writer can scarcely be said to belong to the Malay race, with whatever latitude this indefinite term may be applied. No. 710, the cranium of a Dharma Bhotia, from the sub-Himalayas, has a very extensive parieto-occipital flattening, which is almost symmetrical. Nos. 591, 1191 and 1192, the skulls of Thais, or Siamese (it might be surmised that this deformation is frequent in Siamese skulls, and probably is quite as frequent as in Javans, or other Malays), all exhibit the same appearance strongly marked, the last-very considerably so, and is very oblique. No. 1159, the skull of a New Caledonian, is remarkably distorted in this very manner. Inquiries made from the best authorities do not lead to the conclusion that either Bhotias or Siamese employ any artificial means to distort the skull purposely.

\* The author has not referred in this spot to the *hyperostosis*, which it seems would influence the internal capacity of this otherwise very large skull. He has no doubt, observed the unusually long serrations of the sagittal suture.

† "De Asymmetrie der Javansche Schedels", door H. J. Halbertsma.

Dr. Halbertsma has special opportunities for the investigation of the question he has taken up, and has employed them with much judgment. He has access to 125 skulls of the inhabitants of Java and the neighbouring island of Madura. Of these, 51 are the crania of insane patients from the hospital at Batavia, and the remaining 74, crania of sane persons.

The most prominent feature in the obliquity of so many Javan skulls consists, as a rule, in the flattened posterior and lateral portion of the bony head, either on the right or the left side. It is the *ossa parietalia*, the *os occipitis* and the *partes mastoideæ* of the temporal bone, in the course of the *sutura lambdoidea* and *mastoidea*, which take part in this flatness. In the direction of the line of these sutures, the skull is permanently contracted, while, in the opposite direction, enlargement has taken place, either real or apparent. In some cases the flattening has the consequence of narrowing and deforming the occipital foramen. In others the bones of the face participate in the obliquity of the calvarium.

In looking for the cause of this deformation, Dr. Halbertsma says he first directed his attention to premature synostosis of the cranial bones, but soon perceived this to be inapplicable. He was thus induced to look further, and believes he has found it in mechanical pressure upon the skull from without experienced in infantile life. In Java a child sleeps in a *sarong*, the four corners of which are suspended from the ceiling. As soon as it leaves this cradle, commonly in the second year of life, it sleeps upon the flat hard floor, generally without pillow of any kind. It is to this mode of sleeping, which is continued at an older age, that he ascribes the frequency of asymmetry of the skull. In this period, when the cranium is still pliant and susceptible of impression from without, the individual being placed with the back on a hard horizontal surface, it will incline to the right or the left side, or, what is scarcely possible without careful muscular contraction, rest on the ground just in the middle of the occiput. In such cases the skull will acquire a permanent impression and become flattened on the right side of the occipital region, or the left side, or, in the last instance, the occiput will obtain a symmetrical flatness.

The Memoir is well illustrated with two outline woodcuts. The first of these is the very wry skull of a Javan, seen from above. Dr. Halbertsma draws a line from the right *margo supraorbitalis*, at the spot of the zygomatico-frontalis suture, through the left parietal tuber, and *vice versa*, another crossing on the opposite sides. The difference of the length of these lines gives the measure of the obliquity. The second figure exhibits another symmetrical skull of a Javan with considerable occipital flattening. The line of longest dia-

meter of the calvarium, or *c*, is here seen to pass high up in the parietal region.

It should be remarked that Professor Halbertsma offers his explanation only as an hypothesis. He has added two very carefully prepared tables. Table A contains the skulls of the sane Javans, Table B of the insane. In these he distinguishes the sex, gives the oblique diameters *a* and *b*, expresses the absolute difference between the two, whether the excess be on the right or the left side, etc.; and concludes his interesting Memoir with these deductions.

"1. The frequent asymmetry of the Javan skull, asserted by Van der Hoeven and Swaving, is a fact that is placed beyond a doubt.

"2. This asymmetry consists in the flattening of the lateral portion of the occiput.

"3. It is observed more frequently on the left than the right side.

"4. It is not to be ascribed to the premature ossification of the sutures.

"5. It arises by pressure from without, and probably because the Javan, at an early period of life, adopts the custom of sleeping upon a hard horizontal surface without a pillow.

"6. It is met with in a more exaggerated degree in the insane than in the sane.

"7. The asymmetry gives no occasion to diminution of the volume of the brain.

"8. If there be any connection between this asymmetry of the skull and disorders of the mind, this must be sought in the misformation of particular parts of the brain."

Another dissertation from the same able pen has recently appeared, which should be embraced in our notice. This relates to what he calls the third articular process (*condylus tertius*) of the occipital bone.\* Professor Halbertsma says the celebrated anatomist J. F. Meckel, the third of the name, was the first to fix attention upon a third articular process of the occipital bone in man, occurring on the lower surface of the *pars basilaris*, between the two condyles and behind the so-named *tuberculum pharyngeum*.† The anomaly was not unimportant, since it admits of comparison with the single occipital condyle of birds and scaly reptiles, placed in the median line. Since the appearance of Meckel's Memoir in 1815, the *condylus tertius* has been so frequently observed as to have obtained a sort of citizenship. Meckel noticed it in 1 out of 400 skulls, which does not express the just proportion of its occurrence. Dr. Halbertsma says that he found in 876 skulls, in the Leyden collections, not less than 7 well developed cases, not including those in which there is merely an articular

\* "De derde Gewrichtsknobbel (Condylus Tertius) van het Achterhoofdsbeen", door H. J. Halbertsma, 1865.

† "Meckel's Archiv.", 1815, Band i, s. 644.

groove for the tooth of the *epistropheus*, or *processus dentatus* of the second cervical vertebra. Of these seven cases, six were in crania from the East Indian Archipelago, and only one in a European. As Meckel's observations must have been made almost entirely upon European skulls, and not oriental ones, it seems likely that the existence of this condyloid process is more frequent in some peoples than in others.

It is probable that this supernumerary condyle articulates, in most cases, with the *processus dentatus* of the *epistropheus*. This may be concluded whenever it presents a smooth pit and not a rounded extremity. Dr. Halbertsma adds, that it is doubtful whether it may not also articulate with the fore arch of the atlas. "I should think that this may be the case where the *condylus tertius* is situated far forwards and has no obvious depression." A question difficult to decide so long as the observer has the skull alone for examination without the cervical vertebræ, as is almost universal.

Other questions to which this concise Memoir is chiefly devoted are—How does the third condyle arise, and has it always the same genetic signification? Professor Halbertsma has employed his great opportunities to determine these points, and concludes that it may appear in two forms; first, by the development of a central process; and secondly, in a manner hitherto unknown, by the fusion of two lateral processes, which may run inwards from the anterior ends of the lateral condyles, upon which Gruber bestowed the name of *double middle articular processes*.

*First mode of origin.* As well upon the lower surface of the *pars basilaris*, as upon the edge of the *foramen magnum*, and upon the *clivus*, processes in the median line may appear. But of these only the first two kinds can be developed into a true *condylus tertius*. Of this first mode of origin the author gives illustrations. Form A, pl. i, "vi," fig. 1, a skull in the Anatomical Cabinet at Leyden, is a case in which there is a conical process with a rounded top and no indication of articulation, in the middle and immediately before the edge of the *foramen magnum*, and behind the *tuberculum pharyngeum*. Form B, pl. i, "vi," fig. 2, occurs in the skull of a Bengalese, where, in the middle of the fore edge of the *foramen magnum*, there is a very small process in the form of a blunt cone. This appears to have been articulated with the point of the tooth of the *epistropheus*. The writer's collection contains a well expressed example of Form B in the calvarium of an Araucanian, No. 768. Form C, pl. ii, "vii," fig. 1, in a skull of the Leyden Anatomical Cabinet. This has a process upon the *clivus*, immediately above the fore part of the circumference of the occipital foramen, directed upwards and backwards. It is



somewhat cylindroidal. The author observes that this Form c could never give rise to a third condyle. Two examples of the Form c have been observed in the writer's collection. No. 282, the skull of "Jedoeey," a Dayak of Borneo, and No. 1059, the calvarium of a Lenni Lenape, from Pennsylvania. They both vary slightly from Dr. Halbertsma's figure.

*Second mode of origin.* This consists in the fusion of the double *middle articular processes* of Gruber, which the author considers had better be designated *processus papillares*. They stand either wholly isolated, or are connected with the anterior ends of the condyloid processes by a bony ridge. Form D, "c," pl. ii, "vii," fig. 2. Free standing *processus papillares*, of which the author possesses only one clear example, but it is a remarkable one, in the skull of a Dutch woman of twenty-two years of age. The points of these papilliform processes do not exhibit any indications of articular cartilages. The writer's collection presents examples of this Form D with distinct free papillæ, but none of them quite so long as the papilla on the left side of the author's fig. 2. They occur in No. 311, a Tahitian, Nos. 412, 455 and 620, Kanakas, No. 1171, skull of a Chinese, and No. 1217, skull of a North American Indian. In No. 620 they are most prominent, and, as in the example figured by the author, the *processus papillares* are of unequal length. In this case both papillæ present articular extremities. Dr. Halbertsma's Form E, "D," pl. iii, "viii," fig. 1. The *processus papillares* in connection with the *processus condyloidei*. He observed three instances of this form in skulls of natives of the East Indian Archipelago. The form is scarcely in some cases to be distinguished from the last, and is common. A sub-section of Form E might here be introduced, in which one only of the *processus papillares* is developed. There are examples of it in the writer's collection, of which six may be mentioned, and it seems remarkable that it is the left process in all which has appeared. Nos. 350, 456, and 614, Kanakas; No. 289, a native of Wick, in Caithness, Sutherlandshire; No. 803, a Veddah of Ceylon; and No. 982, a Cingalese. As the highest development of Form E, the two *processus papillares* may grow together and give rise to a *condylus tertius*, which thus will have genetically quite a different signification than when it is developed out of Forms A and B. Pl. iii, "viii," fig. 2, affords an instance of this Form F, "E," in the skull of Parewa, a Buginese. In this case there is a strongly developed, irregular conical process before the *foramen magnum*, that has probably articulated with the anterior half ring of the atlas. It is connected with the two lateral condyles by prolongations to their anterior extremities. On the lower posterior surface it is smooth and has been covered with cartilage, forming an

articular surface which has continued uninterruptedly on the *left* side with that of the left condyle. The three condyles form a sort of irregular half ring surrounding the fore half of the *foramen occipitale*. By the comparison of the figures, the author has no doubt that it will be seen that this *condylus tertius* has been produced by the fusion of the *processus papillares*. He adds, that this case is singular for the mode of origin of the condyle and also for the connection of the articular surfaces. And had there existed no hiatus on the *right* side, to cut off the articular surface of the third condyle from the lateral one of this side, a form would have been produced like the single articular condyloid process of birds and scaly reptiles. The possibility of such a state of things arising from this form, in man, is proved by the example figured.

Professor Halbertsma gives these as the results of his investigations—

“1. That the *condylus tertius* occurs more frequently in inhabitants of the East Indian Archipelago than in other peoples.

“2. That the *condylus tertius*, in the rule, arises as the further development of a process occurring in the median line; but equally, although more rarely, it may owe its existence to the fusion of the two protuberances by him designated *processus papillares* of the *pars basilaris* of the occipital bone.

“3. That the condyle arising in the last named manner should be viewed as a hypapophysis.”

We have devoted some pains to make the elaborate and important Memoirs of Professor Halbertsma, on the curious question of the *condylus tertius* and on other subjects known, under the impression that the researches of so careful and scientific an observer, who has such ample resources, demand and will well repay the attention of anthropologists.

J. B. D.

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